Basic GTS Enterprise
Device Communication Server

SIMCom eloc GL100
Quectel @Track
Spark Nano @Track
Enduro

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Device Communication Server – SIMCom eLoc GL100

Contents:

1 Introduction

2 Configuring the Server
- **2.1 Changing the Server "Listen" Ports**
- **2.2 Setting the "Unique-ID" Prefix Characters**
- **2.3 Setting the SIMCom ELoc Properties**

3 Running the Server
- **3.1 Manually Starting the Server**
- **3.2 Automatically Starting the Server on System Reboot**
- **3.3 Monitoring the Log File**

4 Adding Devices to an Account
- **4.1 Creating a New Device Record**
- **4.2 The "Server ID" Field.**

5 Testing a New Configured Device
- **5.1 Monitoring the Log Files**
- **5.2 Viewing the Unassigned Devices Report**

Appendix:
- **A) Troubleshooting SIMCom ELoc Device Connection Issues**

1) Introduction

This manual describes how to configure and run the GTS Enterprise device communication server (DCS) for the **eLoc GL100** hardware GPS tracking/telematic devices. This is a small personal tracking device that is marketed and sold under the following names (herein called the "**eLoc GL100**"):

- SIMCom eLoc GL100
- Quectel @Track
- Spark Nano @Track
- Enduro

The following features are supported for the **eLoc GL100** DCS:

- Receive incoming data packets via UDP/TCP
- Estimated GPS-based Odometer
- Simulated Geozone Arrival/Departure

2) Configuring the Server

The following section refers to the runtime configuration file for the **eLoc GL100** device communication server, which can be found in the GTS Installation directory at "`dcservers/dcserver_eloc.xml`".

2.1) Changing the Server "Listen" Ports.

The ports on which the **eLoc GL100** DCS listens for incoming data packets is specified on the "`ListenPorts`" tag:

```
<ListenPorts
    tcpPort="37490"
    udpPort="37490"
    />
```

If required, the "listen" port can be changed to fit the requirements of your runtime environment. The script programmed into the **eLoc GL100** device will also need to be configured to transmit data to the same port as the server used to listen for incoming data packets.

The "listen" ports must be open through the firewall in order for the remote device to send data to the **eLoc GL100** server.

If packet acknowledgment is required, any acknowledgments sent by the server back to the remote device must be sent from the same IP address to which the remote device sent it's data packet. If your server responds to more than one IP address, then the **eLoc GL100** server listener must be bound to the same IP address/interface used by the remote tracking devices. This is set in the top-level "`dcservers.xml`" file, on the "`DCServerConfig`" tag, "`bindAddress`" attribute.

2.2) Setting the "Unique-ID" Prefix Characters.

The Unique-ID prefix characters can be set in the "`UniqueIDPrefix`" tag section:

```
<UniqueIDPrefix><![CDATA[
    eloc_
    imei_
    *
    ]]></UniqueIDPrefix>
```

These prefix characters are used to 'prepend' to the IMEI number reported by the device to look up the owning Account/Device record for this device. For instance, if the IMEI number is "`123456789012345`", then the system will search for the owning Device using the following Unique-ID keys, in the order specified:

```
eloc_123456789012345
imei_123456789012345
123456789012345
```

Note that the '`*`' character by itself indicates that the system should look up the IMEI number without any prefixing characters.

To bind an **eLoc GL100** device to a specified Account/Device record, set the "Unique ID:" field on the Device Admin page to the appropriate prefixed unique-id value. For example:

```
Unique ID:  eloc_123456789012345
```

2.3) Setting the eLoc GL100 Properties

Properties which effect the behavior of the **eLoc GL100** server are set in the "`Properties`" tag section. The following properties may be set:

`<Property key="accuracyThreshold">12</Property>`
This is the maximum allowed GPS inaccuracy. The GPS accuracy value provided in the GL100 event record increases as the GPS fix becomes more inaccurate. Values below 10 are considered "accurate". Accuracy values above this threshold will be considered an invalid GPS fix and the latitude/longitude will be set to 0.0/0.0.

`<Property key="minimumSpeedKPH">3.0</Property>`
This is the minimum acceptable speed value, below which the device will considered not moving, and the speed will be explicityly set to "`0.0`".

`<Property key="minimumMovedMeters">0</Property>`
if the specified value is greater than '`0`', then subsequent received events will be omitted if they are within the specified number of meters to the previous event. Useful for eliminating multiple events at the same location, when the device continues to periodically report a location even if the device is stopped.

`<Property key="estimateOdometer">true</Property>`
If "`true`", the DCS will calculate the current event odometer based on the distance traveled since the last valid GPS location.

`<Property key="simulateGeozones">true</Property>`
If "`true`", the DCS will check for geozone arrivals/departures and insert the appropriate arrive/depart events.

3) Running the Server

To begin listening for incoming events the server must be started. This section describes the process for manually starting the **eLoc GL100** server, and how to set up the system to have is automatically start the **eLoc GL100** server on system reboot.

3.1) Manually Starting the Server

The command for manuall starting the **eLoc GL100** server is as follows:

```
>  cd $GTS_HOME
>  bin/runserver.pl -s eloc
```

To start the **eLoc GL100** server with debug logging (useful when testing or debugging), the option "`-debug`" may be added to the command line.

The server will start, and logging information will be sent to the file "`$GTS_HOME/logs/eloc.log`".

For debug purposes, it is sometimes useful to have the logging output sent directly to the console, instead of the log file. In this case the option "`-i`" can also be added to the command-line. When logging to the console, hit control-C to stop the server.

To view the running server, you can use the "`bin/psjava`" command:

```
>  $GTS_HOME/bin/psjava

  PID  Parent  L User     Java class/jar
------ ------  - -------- ---------------------------------------------------
 54639(     1) 1 opengts  org.apache.catalina.startup.Bootstrap
 68936(     1) 1 opengts  /usr/local/GTS_2.2.4-B23/build/lib/eloc.jar
```

To stop the running **eLoc GL100** server, enter the following command:

```
>  cd $GTS_HOME
>  bin/runserver.pl -s eloc -kill
```

This will stop the running **eLoc GL100** server.

3.2) Automatically Starting the Server on System Reboot

The auto-start script for Fedora is located at "`$GTS_HOME/bin/onboot/fedora/opengts`", and should have been installed into the system directory "`/etc/init.d`" when the GTS was installed.

This startup script uses the configuration specified in the file "`$GTS_HOME/bin/serverList`" to determine which device communication servers to start up when the system is rebooted. The line in this file that refers to the **eLoc GL100** DCS should appear similar to the following:

```
execServer  "eLoc GL100"  "eloc"  "${option}"  ""
```

The first quoted string contains the DCS description. The second quoted string contains the ID of the device communication server and must match a library jar file with the same name at "`$GTS_HOME/build/lib/eloc.jar`". The third quoted string must contain the exact value "`${option}`", which is used within the startup script to pass command-line arguments to the DCS startup code. The forth quoted string is used to pass other optional default or constant arguments to the DCS startup code.

3.3) Monitoring the Log Files

When started, the **eLoc GL100** DCS will create the following output log files:

`$GTS_HOME/logs/eloc.pid`
This file contains the process-id (PID) of the **eLoc GL100** DCS execution process. This PID is used by the "`-kill`" option to terminate the running **eLoc GL100** DCS.

`$GTS_HOME/logs/eloc.log`
This log file is where all other logging information is placed regarding the receipt and parsing of data from the remote **eLoc GL100** tracking devices. As this file grows, it will be "rotated" into other log files timestamped as follows:

`eloc.log.`*`YYYYMMDDHHMMSS`*`.log`

Where "*`YYYYMMDDHHMMSS`*" represents the Year/Month/Day/Hour/Minutes/Seconds time that the file was trimmed and rotated.

The "`eloc.og`" file will reflect any current connection attempts from remote **eLoc GL100** tracking devices. As devices send their data to the server, the receipt of the incoming data packets, along with parsing results, will be displayed in this log file.

4) Adding Devices to an Account

When data is received from a remote **eLoc GL100** tracking device, the **eLoc GL100** server looks up the IMEI number in the Device table to determine which Account/Device owns this device. This section describes how to create a Device record and associate an **eLoc GL100** tracking device with the Device record.

4.1) Creating a New Device Record

Using the web-interface, log in to the appropriate Account which should own the **eLoc GL100** tracking device, then traverse to the "Device Admin" page (or "Vehicle Admin", etc, if so named). Create a new Device as indicated in the GTS Enterprise Tutorial documentation, then "Edit" the newly created Device record.

On the Edit page, there will be a field described as follows:

Unique ID: [ ]

In this field enter the value "**`eloc_`***`<IMEI_Number>`*", replacing "*`<IMEI_Number>`*" with the device IMEI number. For instance, if the IMEI number is "`123456789012345`", then enter the value "`eloc_123456789012345`" in this "Unique ID:" field.

After making changes to the Device record, click the "Change" button.

4.2) The "Server ID" Field

The "Server ID" field displayed as a column title on the Device list page, and as a read-only field on the Device Edit page, is assigned a value when the **eLoc GL100** device sends its first data packet to the server. Until then, this value will remain blank.

When viewing a list of created Device records with assigned **eLoc GL100** devices, records which still have blank "Server ID" fields indicate that no incoming data packet has been received for this particular Device.

5) Testing a New Configured Device

This section describes the process for monitoring newly configured **eLoc GL100** devices that have been assigned to an Account/Device record.

5.1) Monitoring for Incoming Connections

The Account report "Last Known Device Location" can be used to display the last know location of a given device, which can also be used to determine whether any events have been received from a specific **eLoc GL100** device.

The "Server ID" field on the Device record will also indicate if a data packet has arrived from a specific **eLoc GL100** device and successfully assigned to the Device record.

If no indication on the Device reports, or "Server ID" field is evident, then the log file itself can be consulted for indications of incoming data packets from the **eLoc GL100** device. The information in the log file can indicate whether an IMEI number may not have been properly assigned, so the **eLoc GL100** DCS is unable to determine which Account/Device the incoming data packet belongs to.

5.2) Viewing the Unassigned Device Report

In the case where an **eLoc GL100** device is put into service without having been assigned to an Account/Device record, or where the IMEI number was incorrectly entered in to the Device record, the **eLoc GL100** DCS may not know to which Account/Device the incoming data packet belongs.

When the **eLoc GL100** DCS cannot determine the ownership of an incoming data packet, it will place the IMEI and currently GPS location into the "UnassignedDevices" table. The "Unassigned Devices" report can be selected from the System Administrator login panel ("System Admin" tab, "SysAdmin Reports" menu option, "Unassigned Devices" report). This report will show the "Server ID" (**eLoc GL100**), "Unique ID" (IMEI number), and the last time data was received from this device. This information can be used to determine whether an IMEI number was ever assigned to an Account/Device record, or if an IMEI number was incorrection assigned to an Account/Device (ie. transposed digits, etc).

Appendix)

A) Troubleshooting eLoc GL100 Device Connection Issues

The following are fequently-asked-questions regarding commonly occurring connection issues.

Q: I've configured an **eLoc GL100** device to send data to the server, but have not received any data.
A: Monitor the "`eloc.og`" file for possible incoming connections from the device. If there is no indication that the server is receiving any communication from the remote device, the most common reasons to check include:

- Make sure device has a valid/active SIM card.
- Make sure the device has been programmed with the proper APN ("Access Point Name") configuration as specified by your wireless service provider.
- Make sure the device has been programmed with the proper host and port of your server.
- Make sure the server firewall allows incoming UDP/TCP connections on the specified port. If the server itself provides its own firewall, then check the firewall settings. On Linux, this is usually controlled by "`iptables`". The command to display the current iptables configuration is "`iptables-save`" (must be run as "`root`"). See "http://www.faqs.org/docs/iptables/iptables-save.html" for more information.

Q: I see data arriving for my device in the "`eloc.log`" file, but it is always the same event that is being sent over and over.
A: If this occurs for all configured/connected **eLoc GL100** devices, the problem is likely that returned UDP acknowledgments are not being returned properly to the device (if the device is configured to require acknowledgments). The most likely reason for this is that your computer responds to more than one IP address, and the returned UDP packets are being sent from a different IP address than the one that the device is configured to send data to. This can be fixed by setting the "`bindAddress`" attribute in the "`dcservers.xml`" file in the GTS installation directory (then restart the **eLoc GL100** DCS). In some cases, the SIM card wireless service provider does not allow returned UDP packets to be sent from the server back to a device. In this case, it may be necessary to program the **eLoc GL100** devices to not require a return acknowledgment.
A: If this occurs for only one device (ie. other devices are reporting as expected), this this is likely due to the GPS receiver's inability to obtain a new GPS fix, and the previous GPS fix is being resent. This usually means that the device is simply in an area where the GPS satellites cannot be seen (ie. Indoors, etc). On rare occasions, this can mean that the GPS antenna has become unplugged, or has been damaged.

Q: The received events have a valid latitude/longitude, but do not have an odometer value.
A: The **eLoc GL100** DCS property "`estimateOdometer`" allows enabling a calculated odometer value, based on the distance traveled between successive GPS points. To enable a calculated estimated odometer value, make sure this property is set to "`true`".